Two anti-pesticide activist organizations, the Farm Worker Pesticide Project (FWPP) and Pesticide Action Network of North America (PANNA) recently released results ("PANNA report") of a limited air-sampling survey conducted outside two homes near Yakima Valley orchards during April of 2006. Dow AgroSciences, the principle registrant of chlorpyrifos, is concerned about some serious misrepresentations contained in this report about chlorpyrifos.

Washington's apples, cherries, pears, and other tree fruit are recognized around the world as the very best and the tree-fruit industry generates nearly $6 billion annually and provides more than 140,000 jobs for Washington families each year. Insecticides such as Lorsban,™ which contain the active ingredient chlorpyrifos, are an important tool in the management of key insect pests that threaten these crops. Dormant and delayed-dormant applications of chlorpyrifos based insecticides are widely used for control of San Jose scale, peach twig borer, rosey apple aphid, pandermis and oblique-banded leafrollers, and climbing cutworms.

Chlorpyrifos has been on the market for more than 40 years and is registered in approximately 100 nations, including most developed nations. Farmers, technical advisors, agronomists and pest control professionals utilize chlorpyrifos products because they fit well into integrated pest management programs, are relatively inexpensive and have a broad spectrum of activity against many insect pests when compared to alternative products.

Due to its widespread use, chlorpyrifos has often been a focus of regulatory scrutiny. As a result of the product's benefits and the extensive scientific database developed over decades on its health, safety and environmental characteristics, regulatory approvals for agricultural Uses of chlorpyrifos are maintained worldwide.

In 2001, following a rigorous 17-year EPA health and safety review, Dow AgroSciences retained its U.S. Lorsban business with all of the product's agricultural uses maintained. In August 2006, EPA reconfirmed its 2001 position on Lorsban in finalizing its cumulative risk assessment for organophosphates without any proposed change in the use of chlorpyrifos.

Outside the U.S., in 2005 the European Union granted continued approvals the use of chlorpyrifos in agriculture. Additionally, the World Health Organization and the United Nations Food and Agriculture Organization have approved the use of chlorpyrifos after thorough scientific review, as have regulators in numerous developed nations. These regulatory approvals worldwide reflect the importance of chlorpyrifos to global agriculture and strength of a data base of over 3,600 studies that support its labeled uses.
The PANNA report claims that children are inhaling dangerous levels of chlorpyrifos from short-term seasonal use of the product based on reported air concentrations in excess of Reference Exposure Levels, then alleging a high potential for serious health effects.

- The levels reported in the PANNA report do not demonstrate that children living near orchards are receiving unacceptable exposures to pesticides. In fact the activist monitoring did not measure children's exposure to pesticides at all.

- By representing these 24 hour air concentrations as exposure, PANNA assumes an infant would be left outside in a fixed position for 24 hours, an unrealistic assumption that likely dramatically overestimates potential exposure.

- The Reference Exposure Levels (RELs) used by PANNA to describe inhalation exposures to chlorpyrifos are based on a No Observable Adverse Effect Level (NOAEL) of 0.1 mg/kg-day. EPA selected this endpoint based on a 90-day rat inhalation study that showed no effects at the highest dose tested. This dose reflected a chlorpyrifos air saturation level of 287,000 ng/m$^3$, which was the highest air concentration physically achievable.

- The highest air concentration reported in Yakima air (572 ng/m$^3$) was 500 times less than a level previously shown to cause no effect in laboratory tests (287,000 ng/m$^3$).

- In its report, PANNA incorrectly positioned the REL as a bright line between safety and danger, which is not how most regulators view this number. Rather, the REL is used as a gauge of when air levels have reached a point requiring further investigation, additional study or some form of regulatory action. But exceedance of the REL does not in itself indicate the presence of additional risk.

The PANNA report claims that Yakima Valley air concentrations of chlorpyrifos are similar to those measured by the California Air Resources Board and that in areas of high chlorpyrifos use there were widespread exceedances of "acceptable" levels for children.

- The highest Yakima Valley air concentrations reported by PANNA (572 ng/m$^3$) were less than half the screening levels used for chlorpyrifos by the California Department of Pesticide Regulation, arguably the most stringent regulatory body in the world.

- In a multi-agency cooperative air monitoring study initiated in 2006 in Parlier California, of the 297 samples collected between January and Mid-August, all 24-hour concentrations of chlorpyrifos were less than 13% of the current DPR acute screening level.

- During 1996, ARB sampled seasonal concentrations of chlorpyrifos in ambient air by placing monitoring stations on several schools during a five week period of high

---


2 http://www.cdpr.ca.gov/docs/envjust/pilot_proj/interim/narrative.pdf
product use in Fresno County\(^3\). Of the 103 samples collected, no single 24-hour sample exceeded the current DPR acute screening level.

The report claims that exposures below "acceptable" levels are not necessarily safe and that there is extensive and compelling scientific data showing that chlorpyrifos and other organophosphates injure people, especially developing babies, through mechanisms other than inhibition of cholinesterase in the nervous system.

- Some researchers evaluating chlorpyrifos exposure in laboratory tests have claimed that inhibition of the nerve cell enzymes may not be the appropriate biological effect for basis regulation and suggest, for example, that chlorpyrifos affects the development of the nervous system or that it causes other biological effects. But research cited to advance this theory, to date, has relied on doses and methods of exposure that raise serious doubts about their applicability to the real world.

- In interpreting the results of such studies for relevance and utility in assessing risk, three criteria need to be considered:
  - The dose at which effects occurred;
  - How the dose was administered;
  - How the tested dose and method of exposure compare with real-world exposures.

- Studies frequently cited to suggest new biological effects for chlorpyrifos typically involve relatively massive doses well in excess of currently established lowest adverse effect levels; extreme methods of exposure, such as injecting chlorpyrifos directly into the brain cavities of animals, or mixing chlorpyrifos with chemicals to heighten its absorption by the body. These studies have little relation to real-world exposures and bear no relation to authorized use of the product.

The PANNA report claims that a recent Columbia University study showed serious developmental effects in New York City children from exposure to chlorpyrifos

- A closer look at the study in question\(^4\) related to learning delays in children reveals significant discrepancies between its data and reported conclusions. The authors themselves note that their findings should be interpreted with caution.

- In fact, the study shows that in the standardized tests used by the researchers as a measure of learning acuity, the performance of children with no detectable pesticide exposure was not different as those receiving the highest exposures. This is not what would be expected if pesticides were linked with these effects.

---


The PANNA report suggests that blood tests for pesticide handlers implicated airborne chlorpyrifos as a public health hazard because many of the workers tested under Washington’s Medical Monitoring Program who experienced significant nervous system impacts had been involved in airblast applications of chlorpyrifos.

- The PANNA report mischaracterizes enzyme depressions of serum and red blood cell (RBC) cholinesterase measured in medical monitoring as significant nervous system impacts. Neither serum nor RBC cholinesterase is directly involved with the function of native acetylcholinesterase in the nervous system. Rather, these two enzymes serve as useful indicators of organophosphate exposure but are not indicative of actual health effects. This is consistent with the lack of reports of health effects by handlers and/or medical providers during the course of the monitoring program.

- An analysis of 2005 and 2006 enzyme depression levels for all handlers with periodic tests of serum and RBC cholinesterase showed the largest preponderance of alerts were associated with air blast application in apple orchards. This suggests that improvements in compliance with personal protective equipment requirements need to be achieved.

- In addition to activities currently underway by "the State, Dow AgroSciences is actively pursuing increased outreach and education on proper use of PPE.

---